THE EXTENSION PATHOLOGIST

"To promote economic crop production, improve the quality of the products, and prevent wastage in storage, transit, and at the market."

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THE INDIANA WEED-CONTROL WORK

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We believe that Indiana enjoys the distinction of being the only State that employs an extension specialist whose entire time is devoted to the various phases of the complex weed problem. This work has been going on for the past three years; and since many extension pathologists include weed control among their activities, it is believed that a brief note regarding the Indiana weed work will be of interest.

When beginning this work, in order that we might know more about the nature of the weed problem in the State, a weed survey was organized. A questionnaire was sent to each of the 84 county agents, requesting the names of the five most troublesome weeds in the county. Seventy-one replies were received. From these it was learned that Canada thistle is the worst weed in the northern half of the State, wild garlic is the most damaging in the southern half, while white top is the most troublesome weed distributed throughout Indiana. Detailed information regarding the weed survey will be sent on request.

A special campaign against wild garlic was then organized with millers, grain buyers, creameries, and other agencies cooperating. The cultivation method described in Purdue Extension Bulletin III formed the basis of the recommendations made, and a recent check up has revealed that the method was successfully demonstrated by a number of farmers.

Several extension methods have been used in putting the Canada-thistle work across. In one county a Canada-thistle eradication club was organized with a membership of over 300. In other counties, the problem was attacked by means of series of township field demonstrations, five per day. Incidentally, the use of Grimm alfalfa against the prickly pest is proving to be a successful method where large areas are infested.

The use of pure seed is an important feature of the weed work. During the winter a pure-seed campaign is conducted with the assistance of newspapers and farm journals and by means of lectures to farmers' institutes and Farm-Bureau meetings.

A very practical phase of the weed work is the location and destruction of weeds new to the State before they have had an opportunity to become widespread. Among the new noxious weed species located and destroyed may be mentioned hoary alyssum, Berteroa incana; gumweed, Grindelia squarrosa; perennial sow thistle, Sonchus arvensis; knawel, Scleranthus annuus; fanweed, Thlaspi arvense; spotted knapweed, Centaurea maculosa; and perennial peppergrass, Lepidium draba. The efforts of a southern seed firm to introduce Johnson grass into the State as a forage crop were frustrated, since this species is already troublesome in limited areas in Southern Indiana.

The field work revealed that poisonous plants, principally white snakeroot in woodland pastures, water hemlock in moist situations, cocklebur sprouts on newly-dried land, and wild cherry along fence rows, are responsible for considerable stock losses, and a great deal of time has been devoted to this phase of the weed problem. Mounted specimens of white snakeroot, our most important poisonous plant, have been sent to all county agents, vocational teachers, and veterinarians in Indiana. The poison-plant work is being done largely through the cooperation of local veterinarians.

An important feature is the destruction of thousands of miles of roadside weeds by the double-mowing method. This work is being accomplished largely through the cooperation of the State Highway Commission.

Among other phases of the Indiana weed-control work may be mentioned the outlining of civic weed-eradication campaigns; the issuing of a monthly publication entitled "Weed and Plant Disease Notes" to county agents and vocational and science teachers; the preparation of weed and pure-seed exhibits; demonstrations of the disc separator for the removal of cockle and other weed seeds and the grading of seed wheat; the preparation of illustrated lectures on weed control and poisonous plants; a simple weed key for the identification of the weeds of Indiana has been issued; radio talks on weeds and poisonous plants have been broadcast regularly; and over 3,000 mail inquiries per year have been answered. The liberal use of the public press has stimulated keen interest in the weed problem among Hoosier farmers.

As a result of the weed-control work, Indiana farmers are paying greater attention to the destruction of weeds, and there is a noticeable demand throughout the State for purer seed.

EXPERIMENTS WITH INOCULATED SULFUR FOR THE CONTROL OF POTATO SCAB IN IDAHO

By J. M. Raeder, Assistant Plant Pathologist,
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This work was started in 1922 at Ashton, Idaho, on 1 acre of ground. Four types of sulfur were used, namely; flowers of sulfur, Toro sulfur, a commercial fertilizing brand; flowers of sulfur mixed with compost containing sulfofying organisms; and commercially inoculated sulfur. These sulfurs were applied at the rates of 300 and 600 pounds per acre, with a grain drill. The results of this first season's work can be seen from Table I.

Table I.- Results of experiments with sulphur for the control of potato scab, 1922

Plot	Treatment	Yield: Weight of clean	Weight of scab: Salable	Weight of scab: Unsalable	Percentage of scab
1	Check	470	600	Trace	56.07
2	300 lbs. flowers of sulfur per acre.	580	760	0	56.71
3	600 lbs. flowers of sulfur per acre.	760	540	0	33.07
4	Check	540	520	0	49.05
5	300 lbs. Toro Sulfur per acre	710	380	0	34.86
6	600 lbs. Toro Sulfur per acre	460	600	0	56.60
7	Check	380	800	Trace	67.79
8	300 lbs. inoculated sulfur per acre.	215	810	13	79.28
9	600 lbs. inoculated sulfur per acre.	280	850	16	75.56
10	Check	130	1,010	Trace	88.59
11	600 lbs. sulfur plus compost per acre	140	910	Trace	86.28
12	300 lbs. sulfur plus compost per acre	20	630	220	97.70
13	Check	55	570	350	94.35

Samples of soil from each plot were procured at time of harvesting by means of which the Ph value of the soil of each plot was determined. These values are as follows:

Table 2. - Ph value of the soil in each plot*

Plot	Treatment	Ph value of soil
1	Check	6.9
2	300 lbs. sulfur	6.8
3	600 lbs. sulfur	6.5
4	Check	6.9
5	300 lbs. "Toro Brand"	6.6
6	600 lbs. "Toro Brand"	6.0
7	Check	6.5
8	300 lbs. inoculated sulfur	6.3
9	600 lbs. inoculated sulfur	5.4
10	Check	6.6
11	600 lbs. sulfur plus compost	5.4
12	300 lbs. sulfur plus compost	5.9
13	Check	6.8

*The Ph values herein reported were determined by the Agricultural Chemistry Department, Idaho Experiment Station.

The average Ph value of the soil of the five checks was 6.74. Although the Ph value of the soil of some of the treated plots was materially reduced, the results obtained at harvesting time showed that control was negative. The seed used in this experiment received the standard corrosive-sublimate treatment.

In 1923 the work was conducted in several localities, both in the northern and southern parts of the State. In the southern part, under irrigation, the results obtained were neither consistent nor positive. Table 3 shows the methods of treatment and results obtained on a plot in the vicinity of Burley, Idaho. As can be noticed, as in the preceding year, the Ph value of the soil was reduced, as should be expected. However, where we expected to obtain the greatest control, namely, in plots 8 and 9, we obtained the least control.

Table 3.- Methods of soil treatment for the control of potato scab and results obtained in southern Idaho, 1923

Plot	Treatment	Ph value of soil		Results	
		Spring	Fall	Percentage clean	Percentage scab
1	Check	9.72	9.21	40.40	59.60
2	300 lbs. sulfur	9.08	8.23	73.10	26.90
3	600 lbs. sulfur	8.61	7.95	63.50	36.50
4	Check	8.99	8.03	57.50	42.50
5	300 lbs. sulfur plus compost	8.55	8.57	70.70	29.30
6	600 lbs. sulfur plus compost	8.23	7.69	69.90	30.10
7	Check	8.01	8.55	64.4	35.6
8	300 lbs. inoculated sulfur	8.55	7.47	50.60	49.40
9	600 lbs. inoculated sulfur	8.49	7.90	62.70	37.30
10	Check	8.44	7.83	52.90	47.10

Somewhat better results were obtained in the northern part of the State, on a plot located near Hayden Lake, Idaho. This plot is in the cut-over section of the State. Here, in addition to using three types of sulfur two varieties of potatoes were used, namely, Idaho Rural and Early Ohio. It will be noticed from Table 4, that with both varieties considerable control was obtained when rates of 300 and 600 pounds of inoculated sulfur per acre were used. The percentage of clean tubers was materially increased, and the percentages of badly scabbed and total scab were correspondingly reduced.

Table 4.- Methods of soil treatment used for the control of potato scab and results obtained in northern Idaho, 1923

Plot	Treatment	Ph value of soil		Results				
				Idaho Rurals			Early Ohios	
		Spring	Fall	Percentage clean	Percentage badly scabbed	Percentage total scab	Percentage clean	Percentage badly scabbed	Percentage total scab
1	Check	5.83	6.26	8	22	92	7	38	93
2	300 lbs. sulfur	5.83	5.55	5	58	95	0	44	100
3	600 lbs. sulfur	6.04	5.31	2	65	98	8	37	92
4	Check	6.31	6.53	12	24	88	0	100	100
5	300 lbs. sulfur plus compost	5.83	5.31	9	38	91	12	38	88
6	600 lbs. sulfur plus compost	5.29	5.29	29	32	71	17	27	83
7	Check	5.80	5.06	5	42	95	7	31	93
8	300 lbs. inoculated sulfur	5.60	5.16	43	14	57	60	6	40
9	600 lbs. inoculated sulfur	5.66	5.26	51	18	49	50	7	50
10	Check	5.63	5.53	8	22	92	7	38	93

On the same farm, a third variety of potatoes, the Early Rose, was grown on plots treated in the same manner as the last two plots of Table 4, with the following results:

Table 5.- Method of soil treatment and results obtained in control of potato scab on Early Rose variety

Treatment	Results		
	Percentage clean	Percentage badly scabbed	Percentage total scab
Check	14	44	86
600 lbs. inoculated sulfur per acre	86	0	14

The Early Ohio variety was the only one in this experiment receiving treatment. The standard corrosive-sublimate treatment was used.

Again, in 1924, one plot was treated in the northern part of the State,

in the vicinity of Hayden Lake, Idaho. Only inoculated sulfur was used; and it was applied at the rates of 200, 400, and 600 pounds per acre. The plot was irrigated three times during the season. In planting, the grower discovered that he didn't have enough seed of the Idaho Rural variety to seed the entire plot; so he, therefore, used Early Ohios in the check. Table 6 gives the types of treatment, method of handling, and results obtained:

Table 6. - Method of soil treatment for control of potato scab and results obtained on one plot in northern Idaho, 1924

Treatment	Results				
	East end of field		West end of field		Average
	Percentage clean	Percentage scab	Percentage clean	Percentage scab	percentage of scab
Check	13	87	65	35	61.50
200 lbs. inoculated sulfur	60	40	89	11	25.50
400 lbs. inoculated sulfur	75.5	24.5	70.5	29.5	27.00
600 lbs. inoculated sulfur	57.0	43.0	77.0	23.0	33.00

It will be noted that a great difference was shown in the amount of scab that developed in the east and west ends of the field. The east end of the field was lower, and water tended to stand there.

None of the scab in the potatoes from the treated plots could be called severe as none of the tubers would have failed to pass as U. S. No. 1 potatoes. In the check plot on the contrary, over 15 per cent of the scabby product was badly scabbed.

Conclusion

It is quite evident from the data submitted that the results obtained from the use of sulfur for the control of scab are very conflicting and that so far as this State is concerned further investigation is necessary.

NOTES ON SEED TREATMENT

SEED-POTATO DISINFECTION SUCCESSFUL IN NEW JERSEY

Extensive seed-disinfection demonstrations were conducted this year in Monmouth and Middlesex Counties by County Agents Douglass and Bowen. In order to make arrangements for this work, a meeting was scheduled in each important potato-growing community. At this meeting the practice of disinfecting seed potatoes was discussed, and at the same time several sacks of seed were disinfected by the cold corrosive-sublimate method. This seed was planted alongside

untreated seed on the farm where the demonstration was conducted. During the growing season careful observations were made to determine the stand, and at harvesting time yield data and scab counts were obtained. In Monmouth County, the average yield of a number of tests was 81.5 barrels for the treated, and 77.3 barrels for the untreated. In addition to this yield difference, there was an increase of 13 per cent in the number of clean tubers on the treated plots. In several instances, where records were kept of the cost of the operation, the cost was found to vary from 85 cents to $1 per acre.

O. G. Bowen, County Agent, Middlesex County, reported on demonstrations conducted on 8 farms. In one instance a decrease of 7 bushels was recorded, while in the others increases amounting to as much as 40 bushels per acre were obtained, the average increase on the 8 farms being 17.6 bushels. In every instance there was an increase in the number of tubers free from scab, amounting in one case to 28.9 per cent, with an average increase of 11.7 per cent.

The results of these and similar demonstrations conducted by County Agent Douglass, in 1923, have aroused considerable interest in the possibilities of seed-potato disinfection, and the indications are that the practice will be adopted by a large number of growers next year.

Wm. H. Martin,
Plant Pathologist,
Agricultural Experiment Station, New Jersey.

DISSEMINATION OF BLACKLEG BY CUTTING AND PLANTING MACHINES, NORTH DAKOTA.

County Extension Agent E. G. Parizek, of Pembina County, N. Dak., outlined a project in the spring of 1924, the object of which was to learn the efficiency of potato-seed treatment as practiced by the average grower of that region. He obtained an equal amount of seed from each of 26 different growers. These lots were planted under his direction on a plot belonging to one of the men. A crop of potatoes had been grown on this ground in 1922. The seed was treated thoroughly with hot formaldehyde, after which it was cut and planted. The planting was done with an ordinary picker planter. The planter was disinfected at the start but was not disinfected again during this series of plantings. The plantings were made in the order that they occur in the table given below.

Counts were made by Mr. Parizek and the writer on August 23. Counts were also made in the home fields of the cooperators who furnished the samples for this project. The heavy infection of blackleg noted in the table greatly interfered with the working out of the original object of the project. However, the amount of Rhizoctonia found in the home fields greatly exceeded that found in the plots. This difference was due, no doubt, partly to a less efficient treatment of the seed and partly to a variation in the degree of soil infestation on the various farms.

Although blackleg had no place in the original conception of this project, the results as tabulated furnish a striking demonstration of the appalling spread of this destructive disease that may come from contaminated cutters and planters. Lots one and two belonged to the man on whose farm the

experiment was conducted. It is evident that blackleg was present in these numbers and was carried on down through the succeeding plantings on the planter pickers. Note that the percentage of blackleg gradually lessens until reinfection takes place from another sample.

Mr. Parizek expects to carry this project through another season and will guard against another outbreak of blackleg by careful hand cutting and planting.

Results of experiment to determine efficacy of potato-seed treatment in Pembina County, N. Dak.

Lot number	Percentage of blackleg infestation			Percentage of Rhizoctonia infestation		
	Experimental plot (hot formaldehyde)	Home field (treated seed)	Home field (untreated seed)	Experimental plot (hot formaldehyde)	Home field (treated seed)	Home field (untreated seed)
1	8.0	----	----	5.6	----	----
2	----	----	23.0	----	----	10.0
3	45.0	Trace	----	Trace	4.0	----
4	32.2	Trace	----	5.0	6.0	----
5	28.0	2.0	----	Trace	10.0	----
6	24.0	Trace	----	Trace	4.0	----
7	22.0	Trace	----	Trace	5.0	----
8	22.0	-----	20.0	1.0	----	15.0
9	25.1	Trace	----	Trace	5.0	----
10	7.0	None	----	1.0	Trace	----
11	3.0	1.0	----	Trace	10.0	----
12	1.5	Trace	----	Trace	8.0	----
13	7.7	Trace	----	Trace	5.0	----
14	2.9	-----	5.0	1.3	----	15.0
15	2.8	Trace	----	Trace	3.0	----
16	6.0	-----	5.0	2.9	----	20.0
17	4.0	-----	Trace	Trace	----	15.0
18	16.0	Trace	----	1.5	5.0	----
19	5.9	-----	5.0	1.3	----	20.0
20	5.6	-----	5.0	1.4	----	25.0
21	4.5	Trace	----	1.8	15.0	----
22	10.0	-----	10.0	5.0	----	10.0
23	6.9	Trace	----	2.1	Trace	----
24	7.8	-----	16.0	1.0	----	3.0
25	20.0	None	----	1.9	5.0	----
26	4.0	-----	6.0	2.0	----	6.0
Average	12.87	0.2+	9.5	1.39	5.77	13.9

Worth Graham Couey,
Extension Pathologist,
Agricultural College, North Dakota.

WHEAT AND BARLEY SEED TREATMENT IN VIRGINIA

Our cereal smut-treatment work has gone over very successfully this fall, and the hot-water method has been applied to more barley than ever before. In all, I think that I have personally supervised hot-water treatment of about 200 bushels of wheat and 100 bushels of barley, the work being done in Warren, Augusta, Botetourt and Appomattox Counties. We could have done a great deal more from our office here if we had had additional time and assistance.

I might also add that in Loudoun County Mr. Lintner tells me that 200 pounds of copper-carbonate dust were used this fall for control of stinking smut of wheat. This was procured from Brooklyn at a cost of 30 cents per pound in large lots. Mr. P. A. Glenn, the Smith-Hughes agricultural teacher at Kenbridge, Lunenburg County, did some work with a few of his cooperators; and as a result, 25 pounds of copper-carbonate dust were sold in that county to be used in the control of stinking smut. Later on we will very likely have more complete information on the copper-carbonate dust as to the number of other counties that used this method in stinking-smut control.

I am enclosing a few pictures of our loose-smut control project. Some of them show quite well the utilization of streams for presoaking the grain before treatment. We have found canning factories to be of considerable assistance to us in carrying on loose-smut control work. (Some excellent photographs accompanied this note, but owing to lack of time required for reproduction, these have been omitted.- F.C.M.)

James Godkin,
Extension Plant Pathologist,
Virginia Agricultural and
Mechanical College.

INDIANA CLUB BOYS MARKET SEED POTATOES

Checking up on the yields of the members of the Certified Potato Club, in Porter County, reveals a production as high as 320 bushels per acre, with some very fine potatoes. A number of the members will display at the State show in January. One boy sold practically all of his seed potatoes for seed to nearby neighbors, and others have disposed of their crops to good advantage.(From Indiana News Notes)

AMERICAN PHYTOPATHOLOGICAL SOCIETY WILL HOLD EXTENSION CONFERENCE

An extension conference is scheduled as a part of the program for the midwinter meeting. This will be held at Central High School, Washington, D. C., on Tuesday, December 30, at 2:00 p.m.

It is planned that this meeting will take the form of an informal round-table discussion on ways by which plant-disease control measures may be brought into more common use. It is expected that activities relating to seed treatment and orchard spray service will be taken up in some detail at this session.

EXTENSION LITERATURE

When making out your mailing list for literature dealing with the subject of plant-disease control please do not forget this office. We are glad to cite all literature of this sort which is sent in.

Florida:

Gratz, L. O., What are good seed potatoes? Fla. Agr. Exp. Sta. Press Bul. 363; 2 p. Oct. 29, 1924.

Indiana:

Gregory, C. T., Present status of the hot water treatment in Indiana. Proc. Ind. Acad. Sci. 1922; 315 - 320, 1923.

Gregory, C. T., Onion smut in Indiana. Proc. Ind. Acad. Sci. 1922: 315-320, 1923.

Michigan:

Moore, H. C., Better potato exhibits. Mich. Agr. Col. Ext. Bul. 36; 18 p. illus. October, 1924.

News notes, extension articles, or suggestions with regard to subjects that might be discussed profitably in this news sheet should be addressed to:

Fred C. Meier,
Extension Plant Pathologist,
United States Department of Agriculture,
Washington, D. C.

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